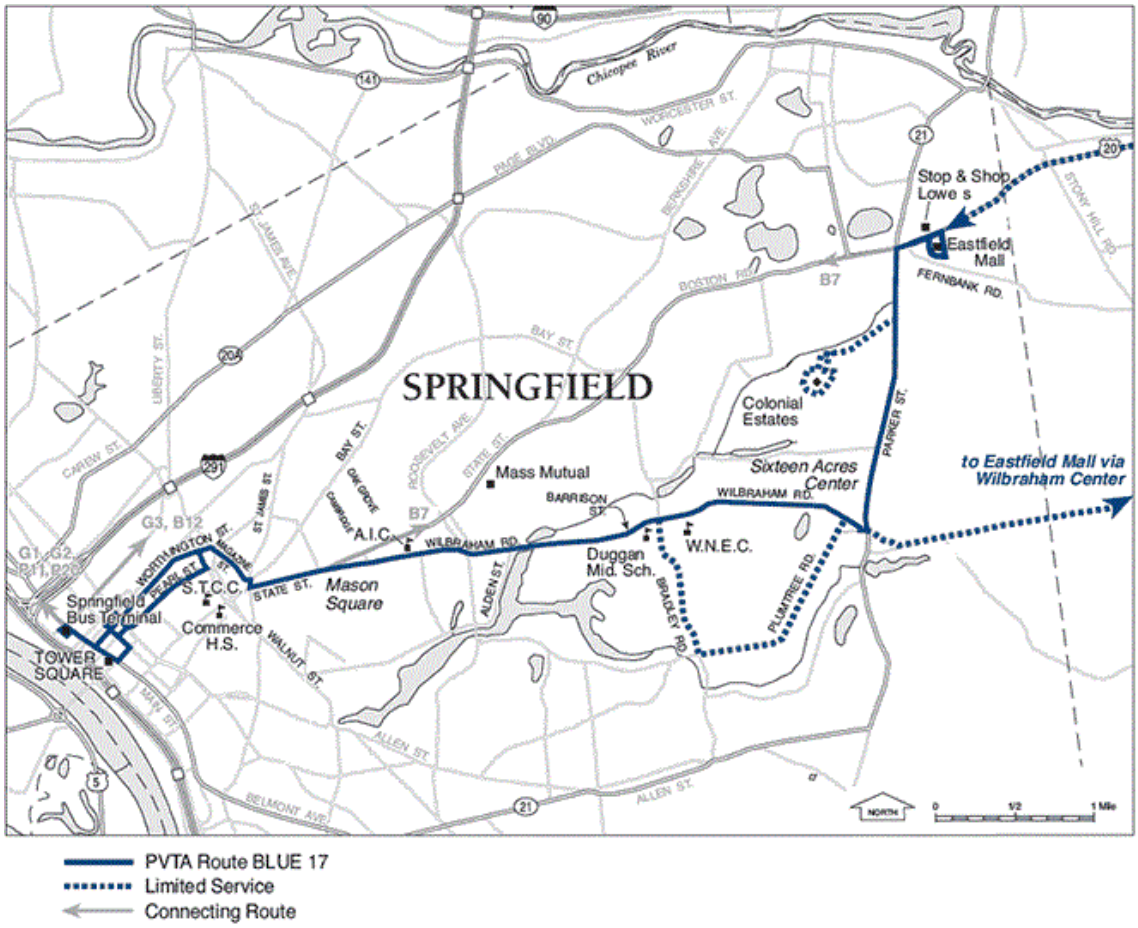
Route Evaluation

17 EASTFIELD MALL VIA WORTHINGTON ST - WILBRAHAM RD - PARKER ST

Service Design. Route 17 Eastfield Mall via Worthington Street – Wilbraham Road – Parker Street is a combination radial and regional route connecting downtown Springfield and the Springfield Bus Terminal (SBT) with the Eastfield Mall as well as Springfield's southern neighborhoods (see Figure 1). Route 17 also provides limited service to Wilbraham Center.

FIGURE 1 – ROUTE MAP



System Interaction and Transfer Opportunities. As a radial route serving the SBT, Route 17 offers connections to the rest of the PVTA system. Riders can also connect with other PVTA services along State Street and Mason Square (Routes 3, 6 and 7) and transfer to Route 7 at the Eastfield Mall.

Alignment/Service Patterns. Route 17's primary alignment operates from SBT via Worthington Street to Magazine Street to State Street. At Mason Square, the bus travels east along Wilbraham Road, turning north on Parker Street to the Eastfield Mall. There are also a handful of service variants:

- A deviation off of Wilbraham Road via Bradley Road and Plumtree Road. Route 17 follows this alignment for every other weekday trip.
- A deviation off of Parker Street to Colonia Estates. Four trips per day travel to the Colonial Estates; two in the AM and two in the PM.
- Two trips per day that travel to Wilbraham Center via Wilbraham Road, Springfield Street, Main Street and Boston Road.

Saturday service is very similar to the weekday service and has the same service patterns, except none of the buses go to Wilbraham and a handful of trips travel in and out of downtown via Pearl Street rather than Worthington Street. Finally, the last trip of the day on Saturday does not pick up passengers at the Eastfield Mall; instead passengers must walk to Boston Road to catch the bus.

Service Schedule. Route 17 operates Monday through Saturday (see Figure 2) with 45 minute service frequencies on all days. Weekday service has more trips (17) because it begins earlier (at 5:50 AM as compared with 7:30 AM on Saturdays). Saturday service also skips one trip between 7:30 AM and 9:00 AM and provides a total of 14 trips.

There is no service on Route 17 on Sundays or on holidays.

FIGURE 2 – SCHEDULE OVERVIEW

SERVICE DAY	SPAN OF SERVICE	TYPICAL FREQUENCY (PEAK / OFF-PEAK)	DAILY TRIPS WESTBOUND / EASTBOUND
Weekday	5:50 AM – 6:45 PM	45	17 / 17
Saturday	7:30 AM – 6:45 PM	45	14 / 14

Source: PVTA route schedules.

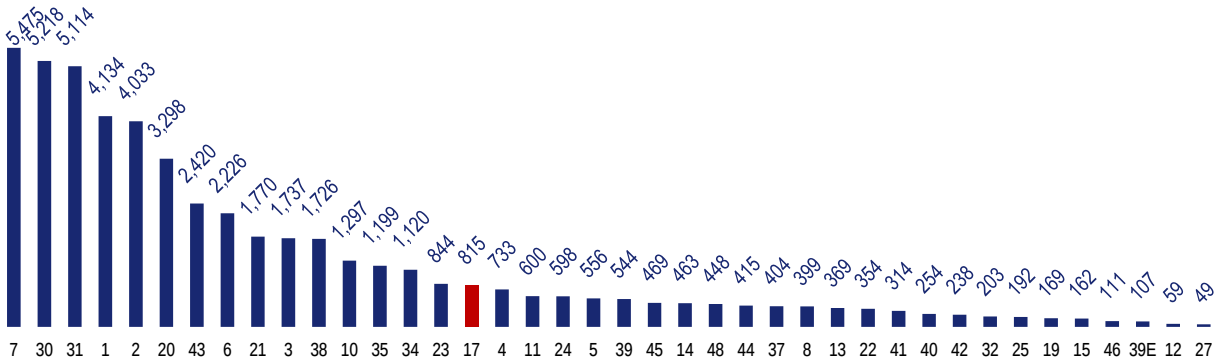
Ridership by Service Day. On an average weekday, Route 17 carries 815 passengers or 24 riders per trip. This is slightly higher than the system average of 23.4 weekday passengers per trip (see Figure 3 and Figure 4). Saturday service carries about half the riders as compared to weekday service, with 424 daily passengers; or about 15 passengers per trip. This is lower than the PVTA Saturday average.

FIGURE 3 – RIDERSHIP STATISTICS

SERVICE DAY	AVERAGE RIDERSHIP PER DAY	AVERAGE RIDERSHIP PER TRIP	
	Route 17	**Route 17**	**System Avg**
Weekday	815	24.0	23.4
Saturday	424	15.1	20.9

Source: PVTA performance data.

FIGURE 4 – AVERAGE WEEKDAY RIDERSHIP



Ridership by Stop. Ridership activity for inbound trips on Route 17 is shown in Figures 5 and 6. Data is shown for inbound only service because inbound and outbound trips are mirror images of each other and the overall patterns can be discerned by looking at one direction only. In the case of Route 17, however, no data was available stops in Wilbraham for the 4:30 PM weekday trips. This is the only inbound trip in the schedule that travels all the way into Wilbraham, so it is not possible to evaluate ridership into this community. (No data was available for the outbound service either).

Ridership data for Route 17 does show that, consistent with radial service, downtown Springfield and the SBT are the most heavily used stops along the route. As a single stop, SBT accounts for 185 passengers or 24% of all riders. The next segment of the route with a large number of riders is the segment between Mason Square and downtown Springfield; this portion of the route – everyone boarding or alighting at or east of Mason Square - account for 37% of all riders. This means about 61% of the ridership is carried on the portion of the route between Mason Square and the SBT, rather than the unique segment of the route west of Mason Square. Outside of the Mason Square to downtown segment, the highest ridership stops on Route 17 are

- The Eastfield Mall that accounts for 51 riders or about 7% of total ridership.
- Duggan Middle School attracts about 26 riders (3%) and the nearby stop at the intersection of Wilbraham Road and Barrison Street attract about 29 riders per day, or roughly 4% of all ridership.
- The stop at Colonial Estates is only served by two inbound trips, but attracts 12 riders and is responsible for 2% of all ridership on the route.
- There is very little ridership on the Bradley Road and Plumtree Road deviation – about 10 riders per day, or slightly less than 2% of all riders.

Given the ridership pattern discussed above, the load profile data shows that the bus starts filling up at Mason Square and, even though some riders are getting off the bus, a larger number get on the bus. Thus the bus has the largest number of passengers as it travels through downtown into the SBT.

FIGURE 5 – WEEKDAY WESTBOUND RIDERSHIP BY STOP GRAPH

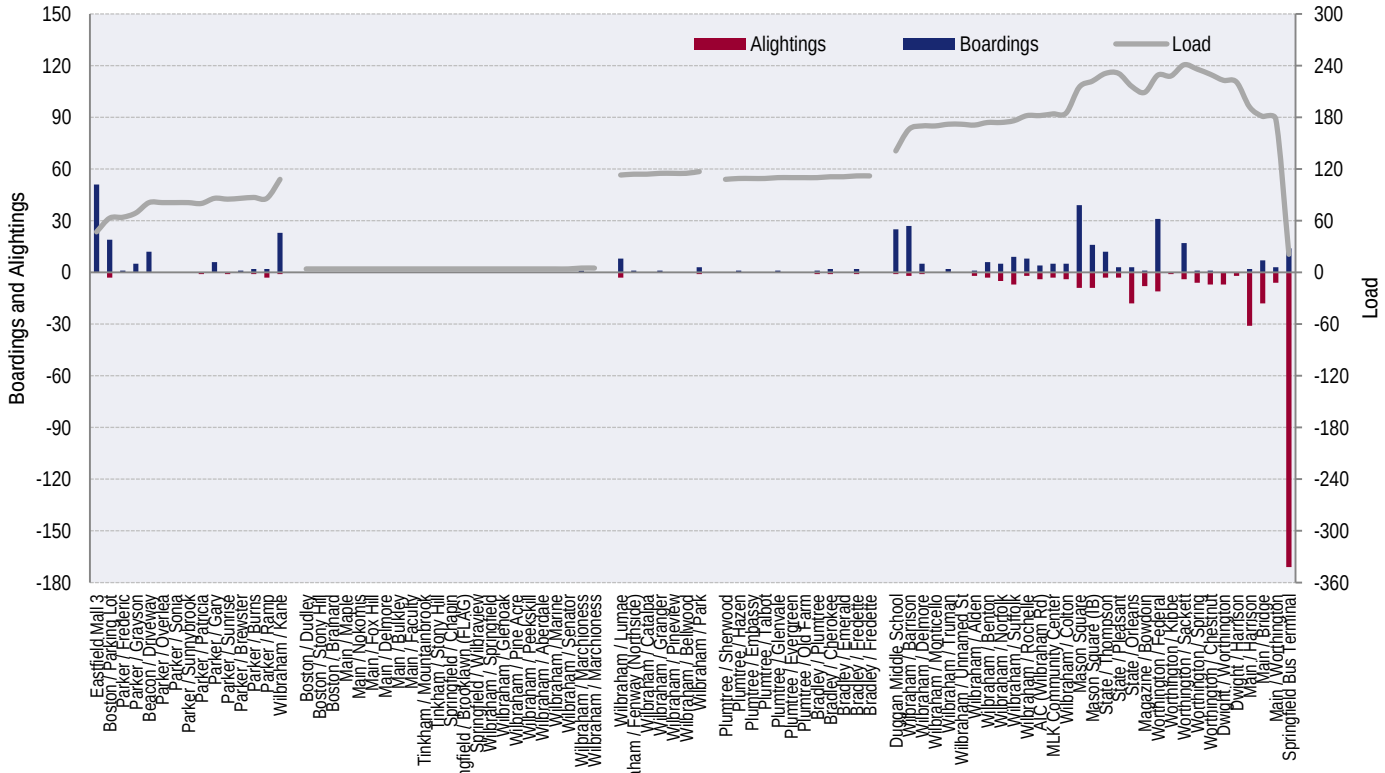
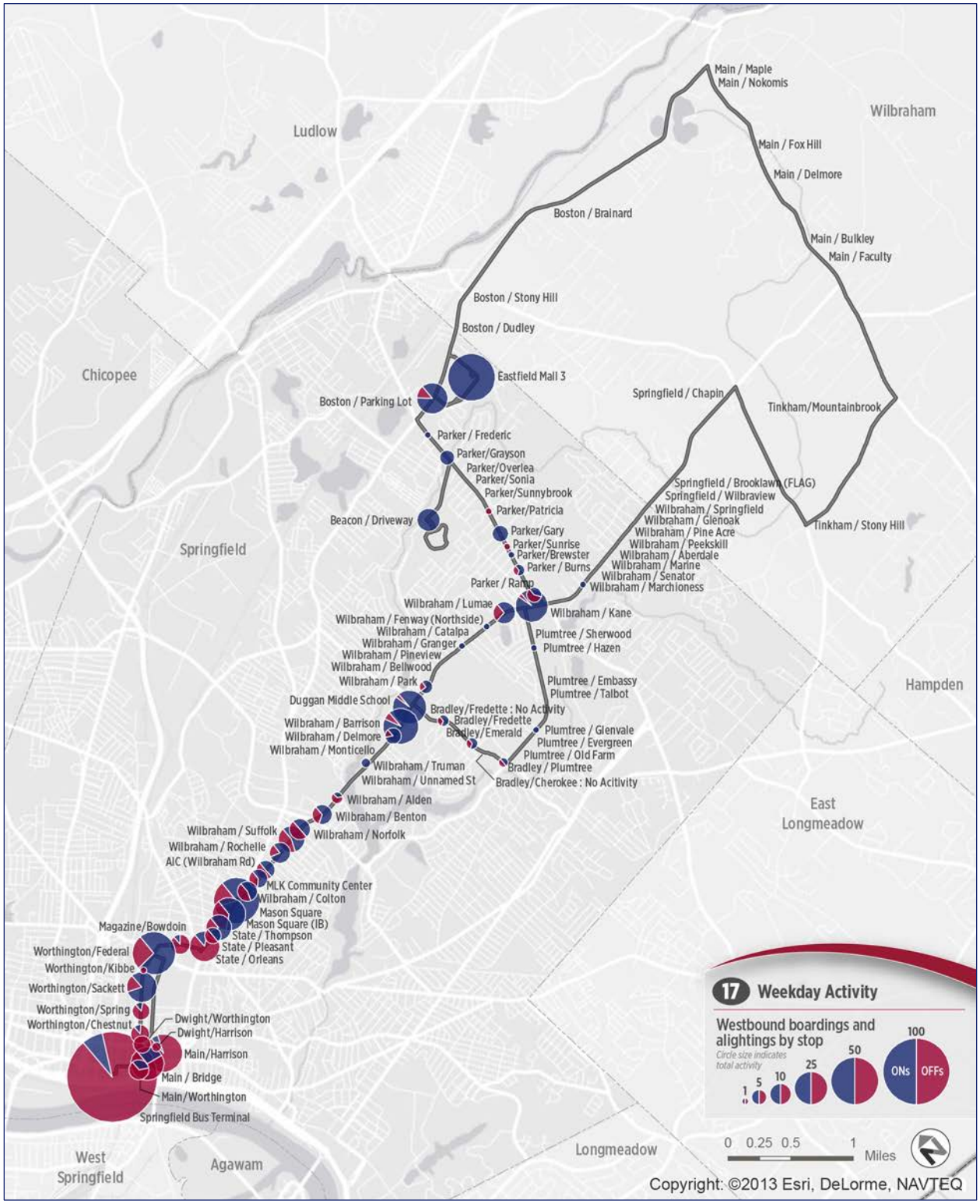


FIGURE 6 – WEEKDAY WESTBOUND RIDERSHIP BY STOP MAP



Weekday Ridership by Trip. Generally speaking, weekday ridership is fairly strong on Route 17 with most trips carrying more than 25 riders per trip. Traveling west, demand is strong throughout the day, except for the first trip of the day and the last few trips, all of which have 15 or fewer riders each (see Figure 7). There is also a spike in demand on the 3:00 PM trip, potentially in response to demand from the middle school students at Duggan Middle School.

Demand on the eastbound trips is similar, except ridership dips in the late morning and is strong through the end of the service day. Consistent with the westbound service, there is a spike in demand on Route 17 which is consistent with school bell times; however, for the eastbound service, there are two spikes in demand, at 7:30 AM and 3:00 PM. This suggests students are using Route 17 to travel to school from both directions.

There are no capacity issues on Route 17, even on the trips with the dramatic spike in ridership.

FIGURE 7 – WEEKDAY WESTBOUND RIDERSHIP BY TRIP

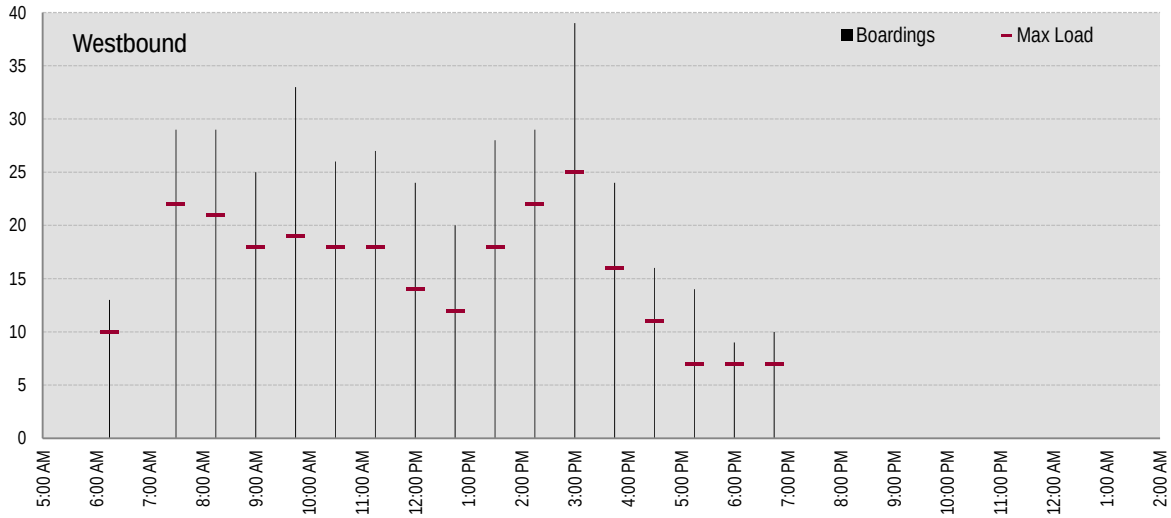
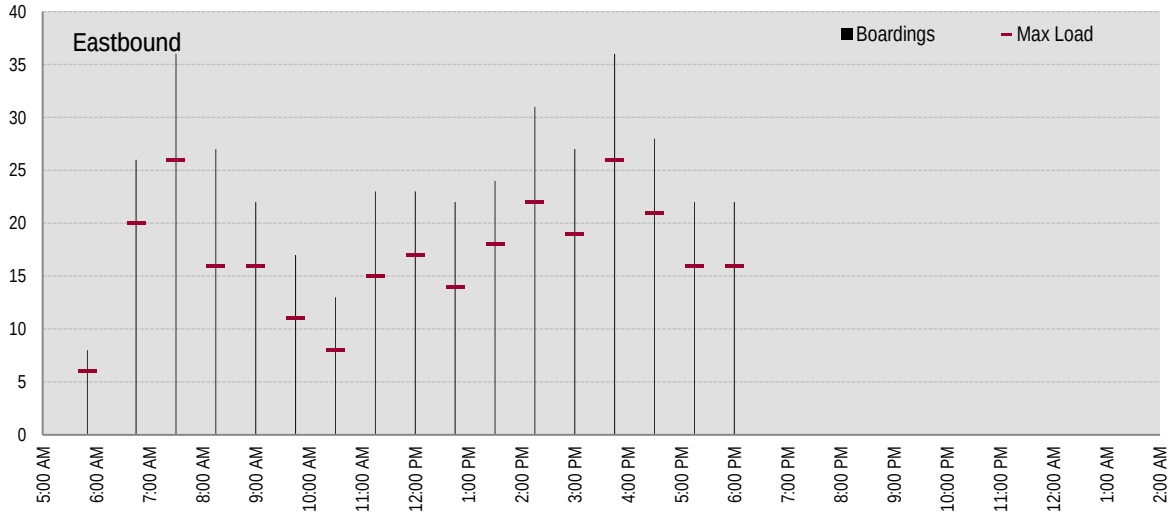


FIGURE 8 – WEEKDAY EASTBOUND RIDERSHIP PER TRIP



Saturday Ridership by Trip. As discussed, Saturday ridership on Route 17 is lower than on weekdays (see Figures 9 and 10). The westbound service is fairly consistent with most trips carrying between 10 and 20 riders. There is high ridership on the first trip of the day but low ridership on the last two trips (6:00 PM and 7:00 PM). Traveling eastbound, demand is more erratic; about half the trips carry more than 15 riders and the other half carry less than 15 riders. Trips with the highest ridership occur just before 1:00 PM, just before 4:00 PM and at 6:00 PM. And, generally speaking, demand is stronger in the afternoon as compared with the morning.

FIGURE 9 – SATURDAY WESTBOUND RIDERSHIP BY TRIP

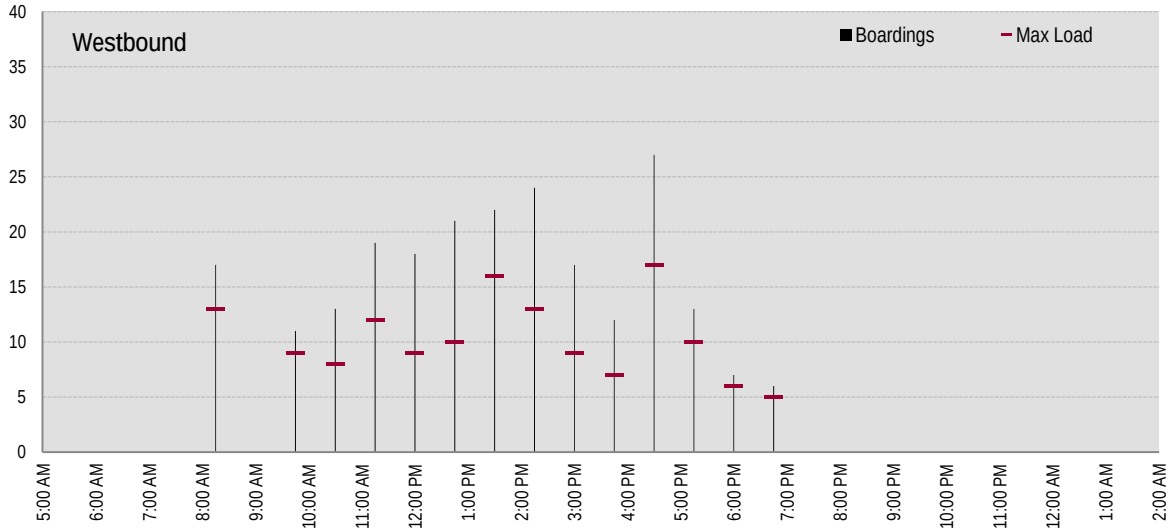
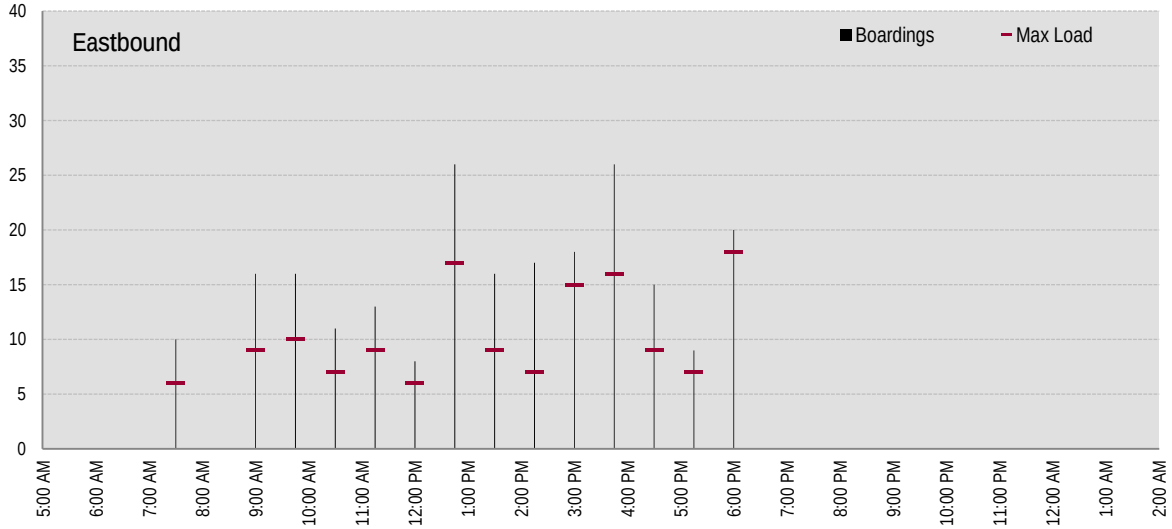


FIGURE 10 – SATURDAY EASTBOUND RIDERSHIP PER TRIP



Performance. Route 17 is a productive service with lower than average operating costs per passengers and more passengers carried per revenue hour and revenue mile (see Figures 11 through 13). This is true for both weekday and Saturday service.

FIGURE 11 – PERFORMANCE MEASURES

PERFORMANCE MEASURE	WEEKDAY		SATURDAY	
	ROUTE 17	SYSTEM AVG	ROUTE 17	SYSTEM AVG
Operating Cost per Passenger (gross)	**$1.38**	$2.05	**$3.03**	$3.54
Passengers per Revenue Vehicle Hour	**32.3**	32.9	**20.3**	31.5
Passengers per Revenue Vehicle Mile	**2.5**	2.6	**1.6**	2.4

Source: PVTA performance data.

FIGURE 12 – WEEKDAY OPERATING COST PER PASSENGER

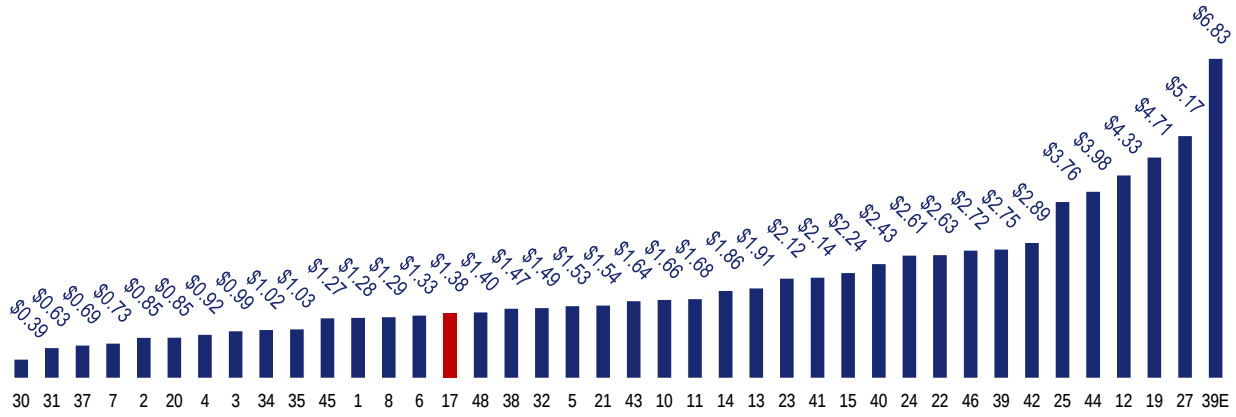
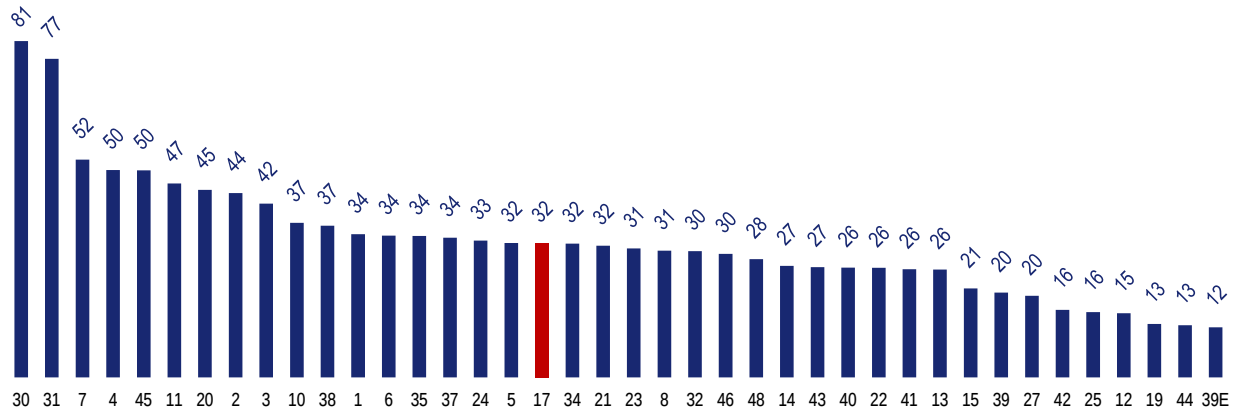


FIGURE 13 – WEEKDAY PASSENGERS PER REVENUE HOUR



SERVICE IMPROVEMENT OPTIONS

Route 17 is a radial/regional route with a handful of service variants, including two into residential areas in Springfield (Bradley and Plumtree Roads and Colonial Estates) and one into Wilbraham Center, a town just east of Springfield. Limitations on the data mean ridership for the service into Wilbraham Center is not understood, but given the overall demand on Route 17 and low level (two trips per day) of service into Wilbraham Center, it is not likely that the service is well used.

Despite high productivity on the route overall, the data shows that more than half of the riders board and alight from Route 17 between Mason Square and downtown Springfield. This is not a unique segment of Route 17 and in fact this corridor is well served by several other routes, including Routes 3, 6 and 7. The high density of service means there is a bus heading into and out of downtown comes between every three and five minutes during the peak period. Opportunities to improve the service, therefore, largely focus on ways to attract riders to the outer or eastern portion of the route. They include strategies such as:

- **Increase service to Colonial Estates.** Ridership on the service variant into Colonial Square is fairly high given the limited amount of service. The housing complex also contains a fairly high concentration of units and is in an area with no other services (shopping, employment, medical, etc.). Thus, it may make sense to route more service to Colonial Estates, especially during traditional work times before the mall opens and in the afternoon peaks between 4:00 PM and 6:00 PM. If service is increased, however, ridership and demand at Colonial Estates should be carefully monitored. Riders traveling to the mall or getting on the mall and traveling into downtown will be inconvenienced by the deviation off of Parker Street, thus PVTA should watch to be sure ridership is increasing in line with frequency.
- **Eliminate service to Wilbraham Center.** Although there is no ridership data, with two trips per day, ridership to/from Wilbraham Center is likely very low and not cost effective. In addition, the Wilbraham – Springfield Road has very low density into Wilbraham as does the Wilbraham segment of Route 20/Boston Road. The service could be eliminated or replaced with demand response service and to increase productivity and efficiency of PVTA service overall.
- **Eliminate service to Bradley and Plumtree Roads.** Ridership on the deviation into Bradley and Plumtree Roads is very low, with ten riders on an average weekday. Given the amount of time it takes to travel this variant and the complexity added to the schedule, the route would be improved by eliminating this service variant.
- **Coordinate service along State Street, potentially short-turning Route 17 service at Mason Square.** The State Street corridor into downtown has a lot of transit service and offers riders a high frequency of service, so much so that many riders likely catch the first bus they see into downtown. Recommendations in other route evaluations (see evaluations for Route 6 and 7) suggest creating an enhanced or bus rapid transit service along State Street, with a potential super stop at the intersection of Oak and State Streets, or just east at Mason Square. One potential service strategy therefore may involve operating Route 17 to Oak and State Streets (or Mason Square) only and encouraging riders to transfer to one of the high frequency State Street buses. This would be somewhat less convenient for riders but increase system efficiency and could provide resources to increase frequency between the Eastfield Mall and Oak and State via Wilbraham Center.
- **Coordinate with Route 8.** Route 8 operates along Plumtree Road and terminates near the southern end of Parker Street. Route 17 serves the northern end of Parker Street. There may be potential to create a cross-town route that connects the Eastfield Mall with the East Forest Park neighborhood. It would provide fast and direct connections from the East Forest Park

neighborhood and the Eastfield Mall as well as create opportunities for people to transfer between routes without traveling all the way into downtown Springfield.